CLEAN VERSION OF CLAIMS AS AMENDED

1. A method for adjusting the atmosphere within a substantially sealed chamber containing respiring produce, the chamber having inlet means to permit ambient atmosphere to enter the chamber, and outlet means to permit chamber atmosphere to exit the chamber, the method comprising:

   (a) monitoring the oxygen concentration within the chamber;

   (b) following detection that the oxygen concentration in the chamber has fallen below a predetermined amount, opening the inlet means to admit ambient atmosphere into the chamber so that the amount of oxygen in the chamber increases; and

   (c) removing carbon dioxide from the chamber atmosphere substantially at a predetermined rate, the predetermined rate having been selected such that the carbon dioxide concentration within the chamber atmosphere does not substantially exceed a predetermined amount.

3. A method according to claim 1 wherein said predetermined carbon dioxide removal rate is calculated from a formula derived from a mathematical model of the proportions of the chamber atmosphere subject to the requirement that the oxygen concentration within the chamber be substantially maintained at a predetermined amount.

5. A method according to claim 3 wherein said predetermined carbon dioxide removal rate is calculated from a formula that produces a result substantially equal to the result produced by a calculation in accordance with the following formula:

$$a_{CO_2} = r_{CO_2} - \frac{0.79 p_{CO_2} r_{O_2}}{(0.21 - p_{O_2}) - 0.21 p_{CO_2}}$$

where a_{O_2} is the carbon dioxide removal rate; p_{O_2} is the oxygen setpoint, expressed as a proportion; p_{CO_2} is the desired carbon dioxide concentration within the chamber, expressed as a proportion; r_{O_2} is the respiration rate; and r_{CO_2} is the rate of production of carbon dioxide through respiration.

10. (Amended) A method according to claim 1 wherein said carbon dioxide removal is effected by contacting a quantity of carbon dioxide absorbing material with the chamber

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atmosphere and wherein said carbon dioxide absorbing material is contained in at least one carbon dioxide transmissible container, said at least one carbon dioxide transmissible container being selected so that the rate of carbon dioxide transmission into said at least one carbon dioxide transmissible container is substantially equal to said predetermined carbon dioxide removal rate.

11. (Amended) A method according to claim 3 wherein said carbon dioxide removal is effected by contacting a quantity of carbon dioxide absorbing material with the chamber atmosphere and wherein said carbon dioxide absorbing material is contained in at least one carbon dioxide transmissible container, said at least one carbon dioxide transmissible container is selected so that the rate of carbon dioxide transmission into said at least one carbon dioxide transmissible container is substantially equal to said predetermined carbon dioxide removal rate.

12. (Amended) A method according to claim 5 wherein said carbon dioxide removal is effected by contacting a quantity of carbon dioxide absorbing material with the chamber atmosphere and wherein said carbon dioxide absorbing material is contained in at least one carbon dioxide transmissible container, said at least one carbon dioxide transmissible container is selected so that the rate of carbon dioxide transmission into said at least one carbon dioxide transmissible container is substantially equal to said predetermined carbon dioxide removal rate.

25. A method according to claim 1 wherein the inlet means is open for a time that is approximately proportional to the difference between the detected oxygen concentration and an oxygen setpoint.

26. A method according to claim 25 wherein, if the difference between the detected oxygen concentration and the oxygen setpoint exceeds a predetermined amount, the inlet means remains open until following detection that the oxygen concentration in the chamber has exceeded a predetermined value.

41. A method for converting a receptacle into an adjusted atmosphere chamber for containing respiring produce comprising:

(a) forming a substantially sealed chamber in the receptacle optionally including installing sealing means so as to form said substantially sealed chamber in said

receptacle;

(b) installing inlet means to permit ambient atmosphere to enter the chamber;

(c) installing outlet means to permit chamber atmosphere to exit the chamber;

(d) installing a controller having an oxygen concentration sensor and control means responsive to the oxygen concentration sensor, the control means being adapted to cause the inlet means to open to admit ambient atmosphere into the chamber following the oxygen concentration sensor detecting that the oxygen concentration in the chamber has fallen below a predetermined amount; and

(e) installing carbon dioxide removal means adapted to remove carbon dioxide from the chamber atmosphere substantially at a predetermined rate whereby the carbon dioxide concentration within the chamber atmosphere will not substantially exceed a predetermined amount when the chamber contains respiring produce.

44. (Amended) A method according to claim 41 wherein said carbon dioxide removal means is a quantity of carbon dioxide absorbing material placed in contact with the chamber atmosphere and wherein said carbon dioxide absorbing material is contained in at least one carbon dioxide transmissible container, said at least one carbon dioxide transmissible container is selected so that the rate of carbon dioxide transmission into said at least one carbon dioxide transmissible container is substantially equal to said predetermined carbon dioxide removal rate.

45. (Amended) A method according to claim 44 wherein said controller is adapted to cause the inlet means to remain open for a time that is approximately proportional to the difference between the detected oxygen concentration and an oxygen setpoint.

49. A method according to claim 45 wherein said controller is so adapted that if the difference between the detected oxygen concentration and the oxygen setpoint exceeds a predetermined amount, the inlet means remains open until following detection that the oxygen concentration in the chamber has exceeded a predetermined value.

62. A method according to claim 41 wherein said sealing means includes at least one flexible substantially fluid impervious sheet carrying inlet means and/or outlet means.

82. A receptacle when converted into an adjusted atmosphere chamber in accordance with the method of claim 41.

117. Apparatus for adjusting the atmosphere within a chamber comprising:

(a) sealing means for substantially sealing the chamber;

(b) inlet means to permit ambient atmosphere to enter the chamber;

(c) outlet means to permit chamber atmosphere to exit the chamber;

(d) a controller having an oxygen concentration sensor and control means responsive to the oxygen concentration sensor, the control means being adapted to cause the inlet means to open to admit ambient atmosphere into the chamber following the oxygen concentration sensor detecting that the oxygen concentration in the chamber has fallen below a predetermined amount; and

(e) carbon dioxide reduction means adapted to remove carbon dioxide from the chamber atmosphere substantially at a predetermined rate so that, in use, the carbon dioxide concentration within the chamber atmosphere will not substantially exceed a predetermined amount when the chamber contains respiring produce.

120. (Amended) Apparatus according to claim 117 wherein said carbon dioxide reduction means is a carbon dioxide absorbing material contained in at least one carbon dioxide transmissible container, the rate of carbon dioxide transmission into said at least one carbon dioxide transmissible container being substantially equal to said predetermined carbon dioxide removal rate.

122. Apparatus according to claim 117 wherein said controller is further adapted to cause the inlet means to remain open for a time that is approximately proportional to the difference between the detected oxygen concentration and an oxygen setpoint.

123. Apparatus according to claim 120 wherein said controller is further adapted to cause the inlet means to remain open for a time that is approximately proportional to the difference between the detected oxygen concentration and an oxygen setpoint.

124. Apparatus according to claim 122 wherein said controller is so adapted that if the difference between the detected oxygen concentration and the oxygen setpoint exceeds a predetermined amount, the inlet means remains open until following detection that the oxygen concentration in the chamber has exceeded a predetermined value.

125. Apparatus according to claim 123 wherein said controller is so adapted that if the difference between the detected oxygen concentration and the oxygen setpoint exceeds a predetermined amount, the inlet means remains open until following detection that the oxygen concentration in the chamber has exceeded a predetermined value.

129. Apparatus according to claim 117 wherein said sealing means includes at least one flexible substantially fluid impervious sheet carrying inlet means and/or outlet means.

132. (Amended) Apparatus according to Claim 117 wherein said inlet means and/or outlet means comprise one or more electromagnetically actuable valves having a solenoid so that said one or more valves may be opened from a closed position and closed from an open position by applying direct electric current to the solenoid, said one or more valves being held in either the open position or the closed position in the absence of the application of said direct electric current.

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143. (Amended) A method for adjusting the atmosphere within a chamber containing respiring produce, the method comprising:

(a) flushing the chamber with a purging gas having a low oxygen concentration or no oxygen;

(b) placing a carbon dioxide absorbing material in the chamber so as to absorb the difference between a predicted level of carbon dioxide in the chamber based on the rate of consumption of oxygen by the produce and a desired carbon dioxide level so that the carbon dioxide concentration in the chamber does not substantially exceed said desired level;

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(c) substantially sealing the chamber either before or after step (a);

(d) adjusting the oxygen level in the chamber to a level above a desired oxygen setpoint;

(e) permitting the oxygen level in the chamber to degrade to about the oxygen setpoint as a consequence of oxygen consumed by the produce being converted to carbon dioxide;

(f) removing chamber atmosphere from the chamber; and

(g) repeating steps (d), (e) and (f) as required if the oxygen level falls below the oxygen setpoint, to maintain the oxygen level in the region of the oxygen setpoint.

146. (Amended) A method according to claim 143 wherein the rate of removal of carbon dioxide from the chamber is calculated from a formula that produces a result substantially equal to the result produced by a calculation in accordance with the following formula:

$$a_{CO_2} = r_{CO_2} - \frac{0.79 p_{CO_2} r_{O_2}}{(0.21 - p_{O_2}) - 0.21 p_{CO_2}}$$

where a_{O_2} is the carbon dioxide removal rate; p_{O_2} is the oxygen setpoint, expressed as a proportion; p_{CO_2} is the desired carbon dioxide concentration within the chamber, expressed as a proportion; r_{O_2} is the respiration rate; and r_{CO_2} is the rate of production of carbon dioxide through respiration.

147. A method for adjusting the level of carbon dioxide in a chamber containing respiring produce, the method comprising the step of placing a carbon dioxide absorbing material in the chamber so as to absorb the difference between a predicted level of carbon dioxide in the chamber based on the rate of consumption of oxygen by the produce and a desired carbon dioxide level so that the carbon dioxide concentration in the chamber does not substantially exceed said desired level.

148. A method according to claim 147 wherein the rate of removal of carbon dioxide from the chamber is calculated from a formula that produces a result substantially equal to the result produced by a calculation in accordance with the following formula:

$$a_{CO_2} = r_{CO_2} - \frac{0.79 p_{CO_2} r_{O_2}}{(0.21 - p_{O_2}) - 0.21 p_{CO_2}}$$

where a_{O_2} is the carbon dioxide removal rate; p_{O_2} is the oxygen setpoint, expressed as a proportion; p_{CO_2} is the desired carbon dioxide concentration within the chamber, expressed as a proportion; r_{O_2} is the respiration rate; and r_{CO_2} is the rate of production of carbon dioxide through respiration.